WHAT IS CLAIMED IS:

1. An image coding method for coding a moving picture, comprising:

a first step of detecting a motion vector for a current image to be coded using a reference image;

a second step of performing motion compensation to the reference image using the motion vector; and

a third step of coding, using orthogonal transformation, quantization and variable-length coding, a difference between the current image and the motion-compensated reference image,

wherein the first step includes:

performing matching between the current image and the reference image to perform a first search; and

performing, if no motion vector is detected in the first search, substantially the same frequency transform to both of the current image and the reference image and then matching between size-reduced images generated by the frequency transform to each other to perform a second search.

2. The method of claim 1, wherein the first step further includes determining, if no motion vector is detected in the second search, to code the current image by intra coding, instead of performing the second and third steps.

3. The method of claim 1, wherein the orthogonal transformation is DCT.

4. The method of claim 1, wherein the variable-length coding is Huffman coding.

5. The method of claim 1, wherein the frequency transform is wavelet transform.

6. The method of claim 1, wherein the first step further includes obtaining a final motion vector for the original current image by provisionally using a motion vector detected in the second search and referring to the original reference image.

7. The method of claim 1, wherein in the first step, if no motion vector is detected in the second search, the frequency transform and matching between size-reduced images are repeatedly performed until a motion vector is detected.

8. The method of claim 7, wherein in the first step, if the frequency transform and matching between size-reduced images are repeated a predetermined number of times and then no motion vector is detected, it is determined to code the current image by intra coding, instead of performing the second and third steps.

9. The method of claim 8, further comprising a fourth step of measuring the coding amount of coded date,

wherein the predetermined number is set according to the coding mount measured in the fourth step.

10. The method of claim 1, wherein in the first step,

whether or not to perform frequency transform to the current and reference images is determined, and

if it is determined not to perform frequency transform and then no motion vector is detected in the first search, the second search is not performed and it is determined to code

the current image by intra coding, instead of performing the second and third steps.

11. The method of claim 1, wherein in the first step,

it is detected whether or not frequency transform has been performed in motion vector detection to a macroblock located in a position in a previous frame corresponding to that of a motion detection target macroblock, or a macroblock adjacent to the motion detection target macroblock in the same frame, and

if the frequency transform has been performed, the first search is not performed and the second search is performed.

12. An image coding apparatus for coding a moving picture, comprising:

a detection block for detecting a motion vector for a current image to be coded using a reference image;

a motion compensation section for performing motion compensation to the reference image using the motion vector detected by the motion detection block; and

a coding block for coding, using orthogonal transformation, quantization and variable-length coding, a difference between the current image and the motion-compensated reference image,

wherein the motion detection block includes:

a first frequency transform section for performing a first frequency transform to the current image to generate a first size-reduced image; and

a second frequency transform for performing a second frequency transform which is substantially the same as the first frequency transform to the reference image to generate a second size-reduced image, and

the motion detection block is so configured to be able to detect a motion vector for

the first size-reduced image by referring to the second size-reduced image.

13. The apparatus of claim 12, wherein

the motion detection block includes a counter at which an upper limit for the number of repeating frequency transform can be set from the outside of the apparatus, and

each of the first and second frequency transform sections has an upper limit of the number of repeating the first or second frequency transform to a current image or a reference image, the upper limit being set at the counter.

14. The apparatus of claim 12, wherein

the motion detection block is so configured to be able to change it operation between performing motion vector detection to the first size-reduced image and performing motion vector detection to the original current image.

15. The apparatus of claim 14, wherein

the first and second frequency transform sections stop their respective operations when the motion detection block performs motion vector detection to the current image.

16. The apparatus of claim 14, further comprising:

a buffer memory for temporarily storing coded data output from the coding block; and

a control section for monitoring a coding amount stored in the buffer memory and instructing, based on the coding amount, the motion detection block to perform motion vector detection to the first size-reduced image or to the original reference image.